

CLAIMS

What is claimed is:

- 5 1. A process of fan out type wafer level package, comprising the steps of:
 - adhering a first plurality of dies to an isolating base;
 - forming a first material layer on said isolating base to fill in a space among said first plurality of dies on said isolating base;
 - 10 curing said first material layer;
 - forming a second material layer on said first material layer and said first plurality of dies;
 - etching a partial region of said second material layer on first pads of said first plurality of dies to form first openings;
 - 15 curing said second material layer;
 - forming first contact conductive layer on said first openings to electrically couple with said first pads, respectively;
 - forming a first photo resist layer on said second material layer and said first contact conductive layer;
 - 20 removing a partial region of said first photo resist layer to form a first fan out pattern and expose said first contact conductive layer;
 - forming first conductive lines on said first fan out pattern and said first conductive lines being coupled with said first contact conductive layer, respectively;
 - 25 removing remaining said first photo resist layer;
 - forming a first isolation layer on said first conductive lines and said second material layer;
 - removing a partial region of said first isolation layer on said first conductive lines to forming second openings;
 - 30 curing said first isolation layer; and
 - welding solder balls on said second openings.

2. The process in claim 1, wherein surfaces of said first material layer and said first plurality of dies are at same level.
- 5 3. The process in claim 1, further comprising a step of sawing said base to isolate said first plurality of dies after the step of said welding solder balls.
- 10 4. The process in claim 1, further comprising a step of adhering a plurality of first passive components to said isolating base among said first plurality of dies onto an isolating base before the step of forming said first material layer.
- 15 5. The process in claim 1, wherein said first plurality of dies comprises at least two types of dies.
6. The process in claim 1, wherein said first plurality of dies is formed by sawing a processed silicon wafer.
- 20 7. The process in claim 4, wherein said processed silicon wafer is back lapped to get a thickness of said processed silicon wafer around 50-300 μ m.
- 25 8. The process in claim 1, wherein materials of said first material layer and said second material layer comprise UV curing type material, heat curing type material, and the combination thereof.
- 30 9. The process in claim 1, further comprising a step of cleaning each surface of said first pads by using plasma etching after the step of etching a partial region of said second material layer.
10. The process in claim 1, further comprising a step of forming an

epoxy layer on back surface of the base.

11. The process in claim 1, wherein said first contact conductive layer comprises Ti, Cu, and the combination thereof.
- 5 12. The process in claim 1, wherein said first conductive lines comprise Ni, Cu, Au, and the combination thereof.
- 10 13. The process in claim 1, wherein said isolation layer comprises epoxy, resin, and the combination thereof.
14. The process in claim 1, wherein a material of said isolating base is glass, silicon, ceramic, or crystal material.
- 15 15. The process in claim 1, wherein said isolating base is a round type or a rectangular type.
16. The process in claim 1, wherein said first contact conductive layer and said first conductive lines are formed by a forming method comprising physical method, chemical method, and the combination thereof.
- 20 17. The process in claim 16, wherein said forming method comprising CVD, PVD, sputter, and electroplating.
- 25 18. The process in claim 1, wherein the step of welding said solder balls comprises placing said solder balls on said second openings by a screen printing method and joining said solder balls together with surfaces of said first conductive lines by a IR reflow method.
- 30 19. The process in claim 1 further comprising further steps before the step of removing a partial region of said first isolation layer, said

further steps being:

adhering a second plurality of dies to said first isolation layer in the vertical direction of said first plurality of dies;

5 forming a third material layer on said first isolation layer to fill in a space among said second plurality of dies on said first isolation layer; curing said third material layer;

forming a fourth material layer on said third material layer and said second plurality of dies;

10 etching a partial region of said fourth material layer on second pads of said second plurality of dies to form third openings;

curing said fourth material layer;

forming second contact conductive layer on said third openings to electrically coupling with said second pads, respectively;

15 removing a partial region of said fourth material layer, said third material layer, and said second material layer on said first conductive lines to forming second openings;

filling up said openings with conductive material and surfaces of said conductive material and said fourth material layer are at same level;

20 forming a second photo resist layer on said fourth material layer, said conductive material, and said second contact conductive layer;

removing a partial region of said second photo resist layer to form a second fan out pattern and expose said second contact conductive layer and said conductive material;

25 forming second conductive lines on said second fan out pattern and said second conductive lines being coupled with corresponding said second contact conductive layer and corresponding said conductive material;

removing remaining said second photo resist layer;

30 forming a second isolation layer on said second conductive lines and said fourth material layer;

removing a partial region of said second isolation layer on said

second conductive lines to forming third openings;
curing said second isolation layer; and
welding solder balls on said third openings.

5 20 The process in claim 19, wherein surfaces of said third material layer and said second plurality of dies are at same level

21. The process in claim 19, further comprising a step of sawing said base to isolate packaged dies having one of said first plurality of dies
10 and one of said second plurality of dies.

22. The process in claim 19, further comprising a step of adhering a second plurality of first passive components to said isolating base among said second plurality of dies onto said first isolation layer before
15 the step of forming said third material layer.

23. The process in claim 19, wherein said second plurality of dies comprises at least two types of dies.

20 24. The process in claim 19, wherein materials of said third material layer and said fourth material layer comprises UV curing type material, heat curing type material, and the combination thereof.

25 25. The process in claim 19, further comprising a step of cleaning each surface of said second pads by using plasma etching after the step of etching a partial region of said fourth material layer.

26. The process in claim 19, wherein said second contact conductive layer comprises Ti, Cu, and the combination thereof.

30 27. The process in claim 19, wherein said second conductive lines comprises Ni, Cu, Au, and the combination thereof.

28. The process in claim 19, wherein said second contact conductive layer and said second conductive lines are formed by a forming method comprising physical method, chemical method, and the combination thereof.

29. The process in claim 19, wherein the step of welding said solder balls comprises placing said solder balls on said third openings by a screen printing method and joining said solder balls together with surfaces of said second conductive lines by a IR reflow method.

30. A fan out type package structure, comprising:

- an isolating base;
- a first die adhered to said isolating base;
- a first dielectric layer formed on said isolating base and filled in a space except said first die on said isolating base;
- a second dielectric layer formed on said first dielectric layer and said first die, and said second dielectric layer having first openings on first pads of said first die;
- a first contact conductive layer formed on said first openings to electrically coupling with said first pads, respectively;
- a first conductive lines formed on said second dielectric layer and corresponding said first contact conductive layer, and said first conductive lines being extended out from corresponding said first contact conductive layer to corresponding first end points, wherein said corresponding first end points are inside a surface of said second dielectric layer;
- a first isolation layer formed on said first conductive lines and said second dielectric layer, and said first isolation layer having second openings on said first conductive lines; and
- solder balls welded on said second openings and electrical coupling with said first conductive lines, respectively.

31. The package structure in claim 30, wherein surfaces of said first dielectric layer and said first die are at same level.
- 5 32. The package structure in claim 30, further comprising at least one passive component on said isolating base.
33. The package structure in claim 30, further comprising a second die on said isolating base.
- 10 34. The package structure in claim 30, wherein said first die is formed by sawing a processed base.
35. The package structure in claim 34, wherein said processed base is back lapped to get a thickness of said processed base around 50-300 μ m.
- 15 36. The package structure in claim 30, wherein materials of said first dielectric layer and said dielectric layer comprise UV curing type material, heat curing type material, and the combination thereof.
- 20 37. The package structure in claim 30, wherein said first contact conductive layer comprises Ti, Cu, and the combination thereof.
38. The package structure in claim 30, wherein said first conductive lines comprise Ni, Cu, Au, and the combination thereof.
- 25 39. The package structure in claim 30, wherein a material of said isolating base is glass, silicon, ceramic, or crystal material.
- 30 40. The package structure in claim 30, further an epoxy layer formed on back surface of the base.

41. The package structure in claim 30, wherein said isolation layer comprises epoxy, resin, and the combination thereof.

42. The package structure in claim 30 further comprising:

5 a second die adhered between said isolating base and said first dielectric layer in the vertical direction of said first die;

a third dielectric layer formed between said isolating base and said first dielectric layer;

10 a fourth dielectric layer formed among said first dielectric layer, said third dielectric layer, and said second die, and said second dielectric layer having third openings on second pads of said second die;

a second contact conductive layer formed on said third openings to electrically coupling with said second pads, respectively;

15 a second conductive lines formed among said first dielectric layer, said fourth dielectric layer, and corresponding said first contact conductive layer, and said second conductive lines extended out from corresponding said second contact conductive layer to corresponding second end points, wherein said corresponding second end points are

20 inside a surface of said fourth dielectric layer;

a second isolation layer formed among said first conductive lines, said fourth dielectric layer, and said first dielectric layer;

25 fourth openings formed in said second isolation layer, said first dielectric layer, and said second dielectric layer on said second conductive lines; and

conductive material filled in fourth openings and electrical coupling with said first conductive lines and said second conductive lines, respectively.

30 43. The package structure in claim 40, wherein surfaces of said third dielectric layer and said second die are at same level

44. The package structure in claim 42, wherein materials of said third dielectric layer and said fourth dielectric material layer comprise UV curing type material, heat curing type material, and the combination thereof.

5 45. The package structure in claim 42, wherein said second contact conductive layer comprises Ti, Cu, and the combination thereof.

46. The package structure in claim 42, wherein said second conductive
10 lines comprises Ni, Cu, Au, and the combination thereof.

47. The package structure in claim 42, further comprising at least one passive component on said isolating base.